A New Echiuroid Worm from the Hawaiian Islands and a Key to the Genera of Echiuridae[1]

WALTER K. FISHER[2]

SINCE ECHIUROID WORMS and their eggs provide excellent material for biological experimentation, it is regrettable that the principal Hawaiian species is without a name. This paper is intended to supply the deficiency.

I collected the type series in 1902, during the Hawaiian cruise of the "Albatross," in tide pools on the reef between Honolulu harbor and Waikiki. The material was sent to the late Professor H. B. Ward and only recently became available for study. A long sojourn in weak alcohol has caused deterioration of the specimens.

Genus ANELASSORHYNCHUS Annandale

Anelassorhynchus Annandale, 1922: 148. Type, *Thalassema branchiorhynchus* Annandale and Kemp.

Diagnosis: Resembling *Thalassema* s.s. in having the longitudinal muscle layer of the body of uniform thickness, without specialized longitudinal bands, but differing in having prolonged, often coiled, lips to the ciliated funnel of the nephridium.

The group contains about twelve species from warm, shallow waters with the exception of an undescribed species from off Monterey Bay, California, 1083 fathoms, bottom temperature 38.5° F.

Anelassorhynchus porcellus new species

Diagnosis: Nephridia four, all behind setae; a very long segment of intestine between end of foregut and beginning of siphon; anal vesicles very long with a special basal inflated portion attached to body wall by muscular frenula; no caecum; setae small, without interbasal muscle; proboscis fleshy, deciduous, the two margins meeting at base to form lower lip; skin rather thick in adult, with transverse verrucae, in contracted state; size 30 to 70 mm. in length, the diameter variable.

Description: Body wall rather thick in large specimens, slightly translucent in smaller ones; skin usually closely wrinkled transversely, so that the small, closely placed glandular swellings have a transverse alignment. In middle of body, owing to stretching of skin, wrinkles may disappear and glands flatten out so as to be practically indistinguishable. (It is pretty much a matter of accident in preservation.)

Setae small (3 mm. long), with well-marked hook, placed rather close together, only a short distance from mouth. No interbasal muscle uniting inner ends of setae; basilaterals rather weak.

Inner layer of muscles of body wall smooth; middle, longitudinal layer undifferentiated as in other species of the genus.

All four nephridia behind setae, variable in size, sometimes greatly distended by sex products. Lips of nephrostome prolonged and usually spirally coiled.

Deflated anal vesicles very long and characteristically swollen at base, which is attached to anterior side wall of cloacal cavity. Walls of this cavity thin and attached to body wall by many frenula which also involve the swollen basal portion of the vesicles (Fig. 1, *c*). In some specimens vesicles covered with tiny

[1] Published with permission of the Secretary of the Smithsonian Institution. Manuscript received April 13, 1948.

[2] Professor Emeritus, Stanford University, Hopkins Marine Station, Pacific Grove, California.

brown spots, perhaps the nephric elements, although ciliated funnels cannot be recognized.

Alimentary canal very long and filled with coarse "sand." No caecum present. Foregut without obviously differentiated subdivisions recognizable from outward appearance. Segment adjacent to ring blood-vessel (B^2) sometimes set off by a slight constriction. Very long segment of the intestine, between B^2 and beginning of siphon, apparently without ciliated groove. (This presiphonal segment is generally short.) In one specimen 50 mm. long, with empty and relaxed intestine, presiphonal segment can be traced for 40 mm. before a break occurs. It is almost certainly longer. Foregut 25 mm. in length. In another specimen a segment about twice as long as foregut is without siphon, although siphon is recognizable over an extensive portion of the midgut. Entire intestine about ten times contracted body length; in specimens examined in a most wonderful snarl, complicated in all but one by sausage-like swellings filled with sand and shell fragments.

Vascular system (Fig. 1, *a*) of usual *Thalassema* type, with well-developed ring vessel and some slight variations in the details of the connection with the neurointestinal vessel (B^3). (It may be remarked that the length of the neurointestinal varies from half the length shown in Figure 1, *a* to five times that length, depending entirely upon position of the end of the forgut, which has great freedom of movement.) In one specimen, killed while passage from stomach to intestine was distended by sand, ring vessel (B^2) three times usual diameter in preserved specimens.

Type: In the collection of the United States National Museum.

Type locality: Honolulu; reef south of harbor, in tide pools, June 6, 1902. Collected by W. K. Fisher.

Specimens examined: Honolulu reef, 15; Puako Bay, Hawaii, 2. I have also examined several collected by R. W. Hiatt at Halape, Hawaii, where they were found in sand under rocks.

Discussion: This species is probably rather closely related to *Thalassema semoni* Fischer (1896: 338, Fig. 4; Amboina) but the description lacks all details of the alimentary canal and figures of importance: Proboscis lost; larger of the two specimens 55 mm.; skin bluish-gray, rather thin and translucent; musculature not split into bundles; papillae cover skin almost without intervals, though more concentrated at posterior end; setae small; nephridia four, with spiral tubes; anal vesicles thin, brown, longer than half the body; they are attached to body wall by muscles; caecum not observed. Fischer states (1914: 19) that *Thalassema sabinum* Lanchester (1905: 40, Tale Sab, Singora) is a synonym of *semoni.* However, Prashad (1919: Pl. 11, Fig. 10) figures a dissection of *sabinum,* which shows a well-developed caecum and short anal vesicles. The proboscis is adherent, being an important respiratory organ owing to the ecology of the species. This figure also indicates that the presiphonal segment of intestine is short. *A. sabinus* is obviously not close to *porcellus* and is probably not the same as *semoni.*

No true *Thalassema* has been recorded from the Hawaiian Islands. Other echiuroids which I have examined from the islands are: *Ochetostoma erythrogrammon* Leuckart and Rüppell, Nawiliwili, Kauai (A. E. Verrill), and Halape, Hawaii (R. W. Hiatt); *Ochetostoma manjuodense* Ikeda, Halape, Hawaii (R. W. Hiatt); *Anelassorhynchus inanensis* (Ikeda), Halape, Hawaii (R. W. Hiatt). There are undoubtedly other species present in these waters.

As the genera allied to *Thalassema* are rather difficult to distinguish, the following synopsis may prove useful.

Keys to other genera of Echiuroidea, principally Bonelliidae, and figures of anatomy will be found in Fisher, 1946.

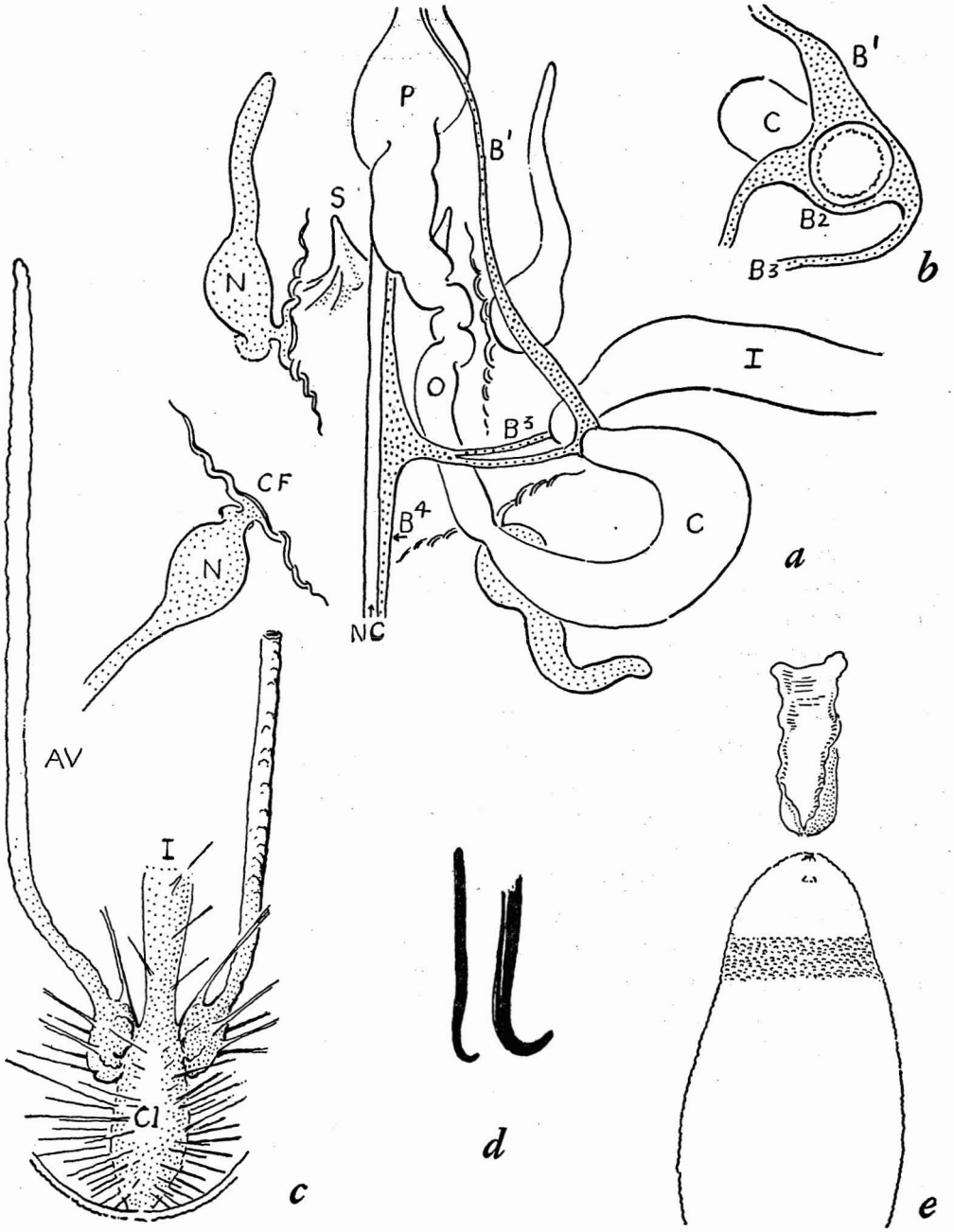

FIG. 1. *Anelassorhynchus porcellus: a,* map of anatomy of anterior portion of body, ×5, (mesenteries are omitted, the foregut [P,O,C] is capable of being straightened parallel to nerve cord so that the neurointestinal vessel [B^3] is then greatly lengthened, the nephridia [N] are usually greatly swollen by contained eggs or sperm); *b,* diagram of ring vessel surrounding end of foregut to show connection with B^1 and B^3; *c,* cloaca with anal vesicles, ×5, from a smaller specimen than *a*; *d,* seta, ×10, and its hook, enlarged; *e,* sketch of anterior two-thirds of a typical specimen with detached proboscis, ×1.

AV, anal vesicles; B^1–B^4, dorsal, ring, neurointestinal, and ventral blood vessels, respectively; C, stomach; CF, ciliated funnel or nephrostome; C, cloaca; I, intestine; N, nephridium; NC, nerve cord; O, oesophagus; P, pharynx; S, seta.

KEY TO GENERA OF ECHIURIDAE

a¹. Two circles of posterior setae.....*Echiurus* Guérin-Méneville
a². No posterior setae present
b¹. No differentiated thicker bands in longitudinal muscle layer
c¹. Nephrostome of nephridia without elongated spirally coiled lips
d¹. The neurointestinal blood vessel in direct connection with dorsal vessel directly by a ring vessel or indirectly by a ring vessel at end of foregut; segment of intestine between ring vessel and beginning of siphon short and with ciliated groove; nephrostome with inconspicuous lips; proboscis not especially expanded at tip, often deciduous.....*Thalassema* Lamarck
d². Neurointestinal vessel connected with dorsal vessel by numerous capillaries in wall of gut; segment of intestine between stomach and beginning of siphon very long (2 or 3 times body length) and with or without ciliated groove; nephrostome with conspicuous flap-like lip; proboscis very deciduous, long, slender, expanded at tip*.....*Arhynchite* Sato
c². Nephrostome with elongated, spirally coiled lips....*Anelassorhynchus* Annandale
b². Longitudinal muscle layer with slight to pronounced differentiation into longitudinal muscle bands, 6 or more in number
c¹. Nephrostome of nephridia with small circular lips; inner layer of muscles not differentiated into separate transverse fascicles between longitudinal bands.....*Lissomyema* Fisher
c². Nephrostome with elongated spiral lips
d¹. Differentiated muscle bands weak, the zones between not showing a fasciculate arrangement of inner oblique muscles; in small specimens longitudinal bands very faint or visible only in posterior region.....*Listriolobus* W. Fischer
d². Longitudinal muscle bands strongly developed; zones between crossed by separated fascicles of innermost oblique layer
e¹. Nephridia in 1 to 5 pairs; vascular ring vessel at beginning of midgut.....*Ochetostoma* Leuckart and Rüppell
e². Nephridia, at least in male, in 6 to 14 groups of 1 to 4, the groups arranged in pairs; vascular ring vessel at posterior end of pharynx.....*Ikedosoma* Bock

* I have specimens of a new form from off California in which the proboscis is present. In the two described species there seemed to be no trace of a proboscis scar.

REFERENCES

ANNANDALE, NELSON. 1922. The marine element in the fauna of the Ganges. *Bijdr. Dierk.*, pt. 22, Feest-nummer 70sten Geboortedag van Dr. Max Weber, p. 143–154.

FISCHER, WILHELM. 1896. Gephyreen. Zoologische Forschungsreisen in Australien und dem Malayischen Archipel. Bd. 5. In: *Denkschr. Med.—Naturwiss. Gesellsch. Jena.* 8: 337–339, figs. 1–4.

——— 1914. Weitere Mitteilungen über die Gephyreen des naturhistorischen (zoologischen) Museums zu Hamburg. *Hamburg naturh. Mus., Mitt.* 31 Jahrg., Beih. 2: 1–28, 1 pl.

FISHER, WALTER K. 1946. Echiuroid worms of the north Pacific Ocean. *U. S. Natl. Mus., Proc.* 96: 215–292, pl. 20–37.

LANCHESTER, W. F. 1905. On the sipunculids and echiurids collected during the *Skeat* Expedition to the Malay Peninsula. *Zool. Soc. London, Proc.* 1905: 35–41, 1 pl.

PRASHAD, B. 1919. Zoological results of a tour in the Far East. Echiuroids from brackish water with the description of a new species from the Andamans. *Asiatic Soc. Bengal, Mem.* 6: 323–338, 1 pl.